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BOOK REVIEWS

Secondary Electron Spectra from Charged Particle Interactions
(ICRU Report 55)
International Commission on Radiation Units and Measurements (ICRU) : Maryland, 1996
x + 114 pages, illustrated ; price : $ 65.00 (Soft cover) ; ISBN 0-913394-54-8

This report provides a detailed information about the emission of secondary electrons in collisions of electrons, protons, alpha-particles and heavier ions with free atoms and molecules and with the condensed matter.

It has been divided into six sections and the corresponding sub-sections.

In the Introduction, the purpose and the scope of this report are mentioned. In addition, an outline of the Notation and Concepts, the Role of Secondary Electron Data in Radiological Sciences and Guide for users are given.

The following sections are the Theoretical Methods; Electron-Interactions; Ion Interactions; Electron Spectra from Condensed Matter; and the Applications of Ionization Data to Radiological Sciences. At the end, a list of references and the ICRU reports are added. A Preface including Scope of ICRU activities, Policy, Current program, the relationships of ICRU with other organisations has been introduced by the Chairman of ICRU at the beginning. A Glossary including a few abbreviations has been added before the text matter.

This report deals with the ionization and written in a very descriptive way starting with the fundamental conception. The triple differential cross sections for ionization are not included here since a very few measurements are performed as yet and a little applications of these have been found in radiological applications. The fitting paramaters have been supplied here for a particular model which can be used to generate reasonably accurate differential cross sections for proton impact on ten different targets for all proton and secondary electron energies.

In section 4, the mechanism of ionization by Ion impact has been discussed in detail. There the Autoionization and Auger Emission; Electron Promotion and Multiple Ionization

have been defined giving an exhaustive set of references. The experimental as well as the theoretical methods are explained in detail both keeping on an equal footing.

In the section "Electron Spectra from Condensed Matter" the production of Free Internal Electrons and Ejection from the surface are discussed.

The last section is the application of ionization data to issues in Radiological Sciences, there the informations about Charged Particle Track Simulation, Microdosimetric Distributions are given. There it is shown how the spectra of secondary electrons are related to radiological parameters and the track entities are derived from the electron spectra, further, the track entities in Radiochemistry and in Radiobiology are discussed. The application of secondary electron spectra to the study of chemical yields induced by the passage of fast heavy charged particles, the investigation of mechanisms for the production of biological damage and in the understanding of the RBE of different type of radiation are explained.

The spectrum of electrons produced by ionization can provide detailed information on stopping power of heavy charged particles. Linear Energy Transfer (LET) is the stopping power minus the energy carried away by secondary electrons of high energies to large distances. These stopping powers and LET have been discussed in detail.

Finally, it can be concluded that this report is really very useful especially for those who are working in this field.

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Fundamentals of Quantum Mechanics

by Y R Waghmare

Wheeler Publishing : New Delhi-Allahabad, 1995
xv + 472 pages, illustrated; price : (Soft cover); ISBN 81-85814-22-8

This book is an outgrowth of the author's earlier work "Introduction to Quantum Mechanics". In fourteen chapters, the book discusses the foundations of Quantum Mechanics, single particle bound states, barrier penitration and potential scattering, approximation methods like perturbation theory and variational theory, many particle systems, second quantisation and Dirac theory of the electron. Thus, the development of the subject was made from the elementary idea upto second quantisation in a very systematic and lucid way. There is also a special chapter on the various Angular Momentum coupling coefficients. Moreover, there are four appendices covering some important mathematical tools in connection with the study of Quantum Mechanics.

The author has tried his best to develop the idea of Quantum Mechanics step by step so that it becomes easier for a student to grasp the subject. An outstanding feature of this book is the inclusion of a large number of problems with hints for solutions. This makes the book a very useful one both for the students and for the teachers of Quantum Mechanics.

In chapter 7, however, there is an ambiguity regarding the statement of the spin value of pions and mesons to be 1. Actually they have zero spin value but 1 isospin value. It would be better if it is clarified in the text. The name of Paul Gordan is mis-spelt in page 157 which should be corrected. There is also a noticeable omission of the role of Symmetry in non-relativistic single particle Quantum Mechanics, which should have been included. Finally in my opinion, the book is suitable as a reference book to the undergraduate Physics Honours students. It also covers quite a major portion of the post graduate syllabi in Physics of almost all Indian Universities. So it is equally helpful for the post-graduate students as well.

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Gravity Revealed
(The Accelerating Mass Field and its Cosmological Consequences)

by R Hall

ix + 126 pages, illustrated, soft cover; ISBN 0-9640159-0-0

The book 'Gravity Revealed' as well as the synopsis supplied by the author is abstruse, nay unintelligible to the present reviewer. The author writes, "The main thesis of this book states that gravity is an experience, not a force". It is not clear if this experience is subjective or objective. If it is the former, then the subject matter will not be considered as part of science because Science believes in the existence of a material, World independent of human perception. The reviewer is not competent to judge a "thesis" of positivist philosophy. If it is the latter, the author must cite experimental evidence that confirm his "thesis" as opposed to the generally held belief.

The author states in the introduction to his book "Well over twenty years ago I came across a core idea regarding gravity put forth by Kent Robertson ben Abraham. I felt some of his motions were so stunning that, ultimately, it brought me to the point of writing this book." The book referred to is : Kent Robertson ben Abraham, The New Gravity (San Francisco) (CA, 1975).

The reviewer does not have access to this book. However, some quotations from the said book given by the author are equally unintelligible. Here is an example quoted on page 41. "Gravity is (the cosmological constant)".

Many technical terms used in this book are familiar to a physicist but these have been used here in a completely different sense. The above quotation is an example. Here is another example from page 28 of the book "AMF suggests that the Doppler shift does not actually occur until the photon is absorbed and measured (the Electro-Magnetic wave "collapses" as measured photon)". No attempt is made to justify this belief by experimental evidences.

The whole book is full of such statements without any attempt to justify them. Every physicist knows that the subject of general relativity, *i.e.* Einstein's theory of gravitation (to which the author refers frequently) is highly mathematical. But this book contains no mathematical symbols except one equation on page 91 which is equally unintelligible.

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